

PHENIX WEEKLY PLANNING



Nov. 14, 2013
Don Lynch

This Week

- Complete Assembly and Test FVTX/VTX East & West
- Complete Survey of FVTX/VTX West, East
- Prepare to move FVTX/VTX to 1008
- Continue upgrading VTX/FVTX supply/return lines to stainless
- Complete Assembly and test of MPC-Ex for run 14
- Continue sPHENIX support
 - HCal prototype assembly
 - EMCal prototype assembly
- Future IR evolution modeling

Next Week

- Move FVTX/VTX East & West to 1008
- Install FVTX/VTX East and West
- Attach FVTX and VTX Services
- Begin FVTX/VTX Survey
- Install MPC-Ex for run 14
- Begin connecting MPC-Ex power, signal and services
- Continue sPHENIX support
 - HCal prototype assembly
 - EMCal prototype assembly
 - Tilting/rotating SupportStructure assembly & test
- Future IR evolution modeling



FVTX/VTX East &
West Assembled
ready for survey

To be ready for
installation by 11/15

11/14/2013

VTX & FVTX Remaining Tasks

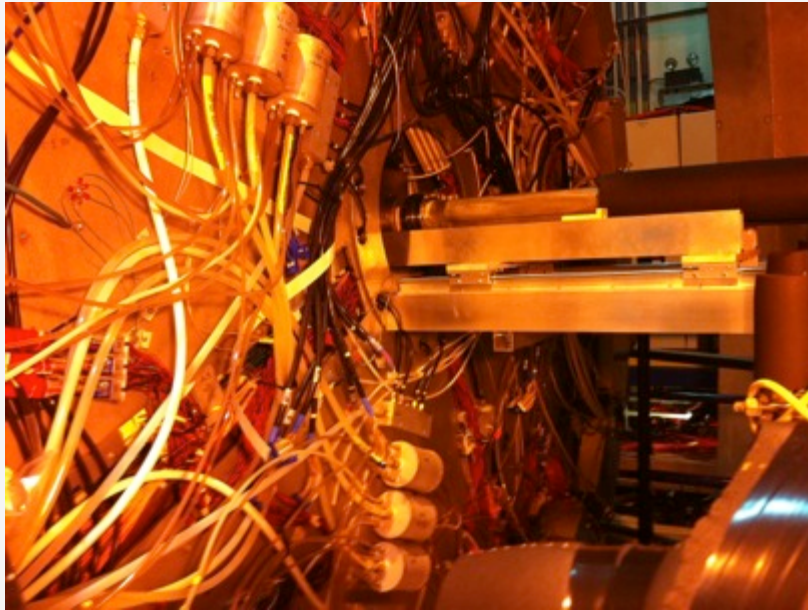
Receive remaining strippixel stave components	Done
Assemble & test strippixel staves	Done
Receive remaining pixel ladders	Done
Test pixel ladders	Done
Integrate staves & electronics & test	Done
Assemble East & West VTX & test	Done
Transport FVTX to Chemistry building.	Done
Integrate FVTX Integrated into East & West VTX.	Done
Survey VTX/FVTX assembly	By 11/15
Transport VTX&FVTX assembly to PHENIX and install on rails.	11/18
Re-install coolant and N ₂ lines, LV, signal and HV cables and fibers	by ~11/25
Re-survey full detector in IR	by 11/27
Re-commission VTX & FVTX	by 1/1/14

DC East & West Repairs Summary of Tasks

PHENIX
STATION

- East Carriage move to AH - Done
- Work Permit - Done
- Design & Construct tent (similar to tent constructed for DC West last year) to prevent foreign material from entering DC East cavity while window is removed. - Done
- CAD to provide 2 vertical manlifts to allow DC experts to remove and replace window - Done
- Get supplies and materials from Stony Brook for window replacement - Done
- Troubleshooting and repairs on DC West - Done
- Supply Gas, DAQ and Electric to EC East - Done
- Isolate and repair leak on DC East - Done
- Remove and replace window - Done
- Isolate and repair leak under electronics card - Done
- Leak test - Done
- Operational tests - Done
- Remove tent and manlift - Done
- DC West broken wire removal - 12/15 - 12/30

MPC-Ex Initial (Partial) Installation



Testing at 510 to be completed today

Safety Review completed 11/12/13:

- Lifting bracket approval
- Magnetic components check
- Horizontal position control

Vacuum bellows anti-squirm in MPC S Cavity installed.

Installation tool assembled; Tool placement for installation is in progress

Test Fit of partial assembly Done

3 tungsten/carrier board laminations done

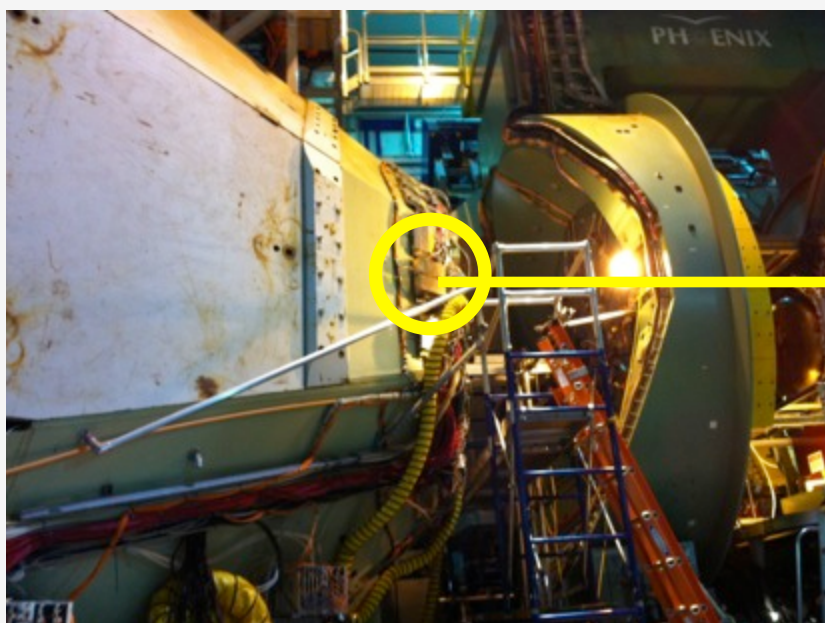
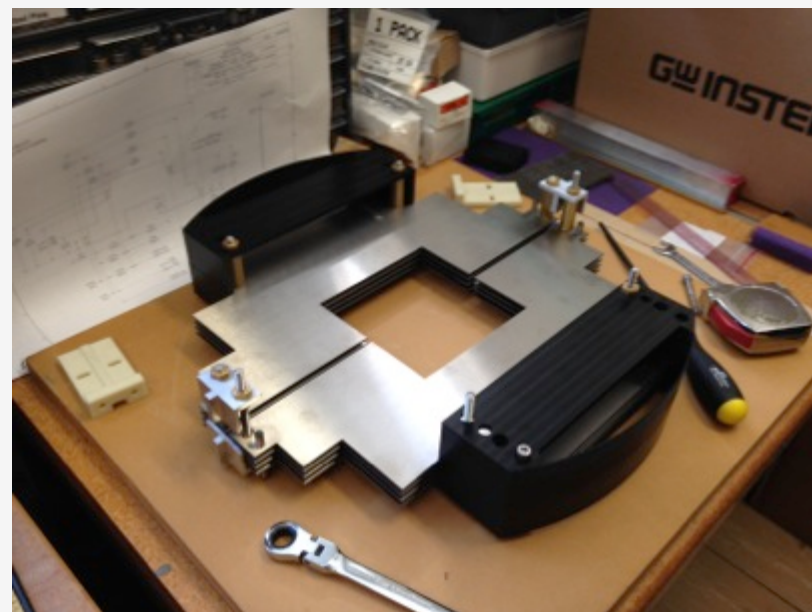
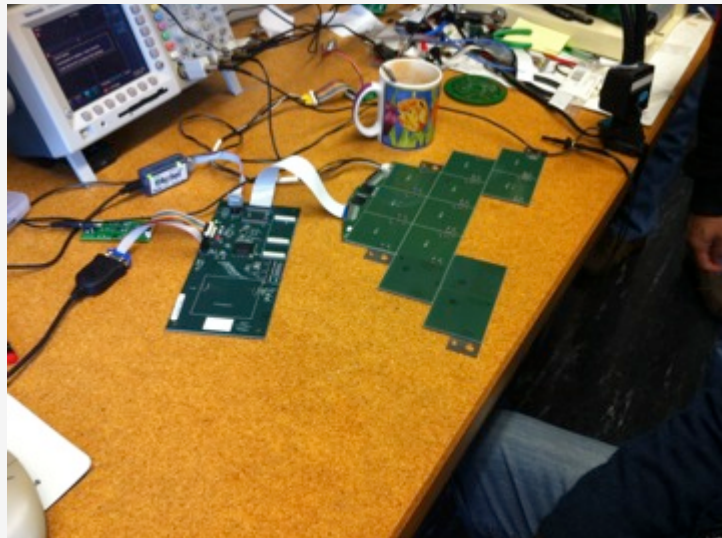


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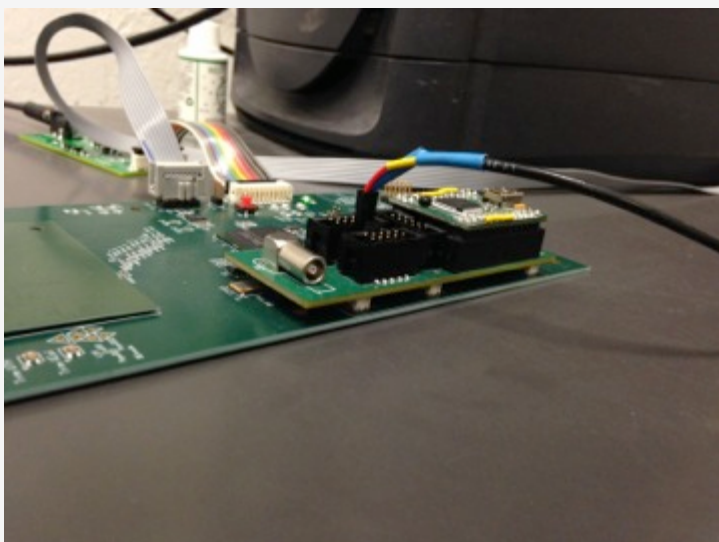
PHENIX - SDC FRONT - NO-3

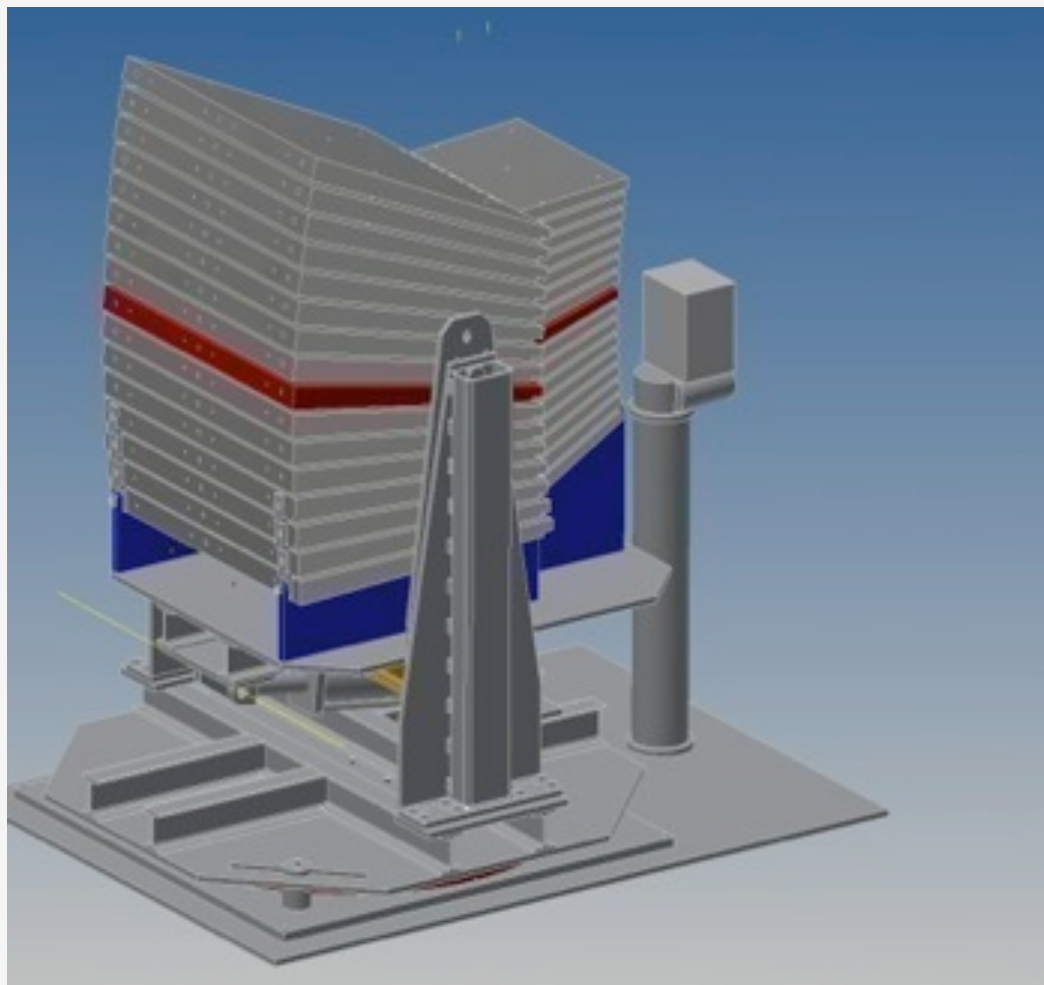


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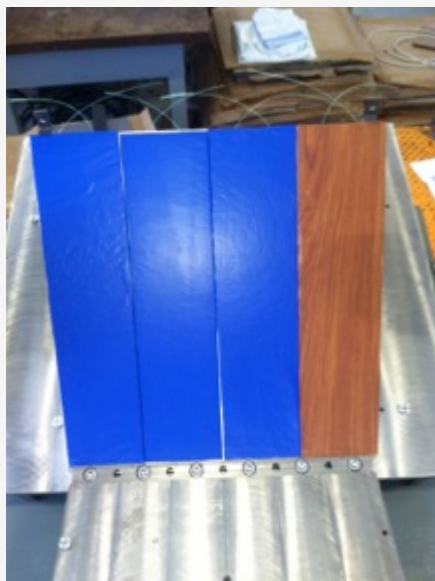
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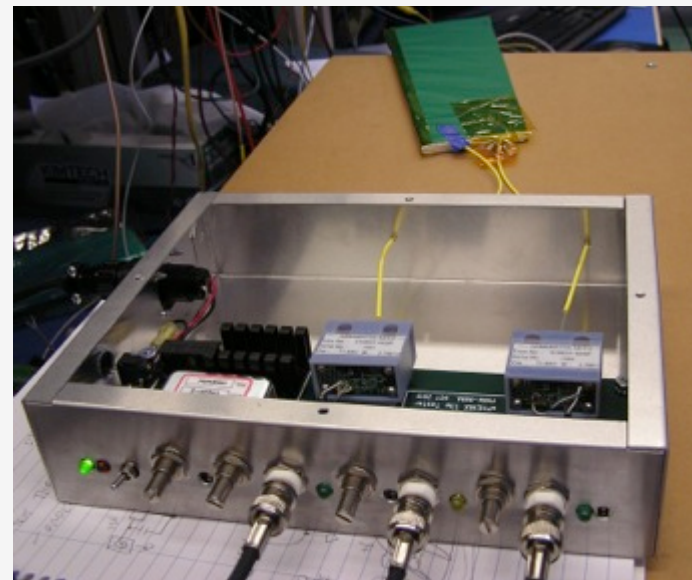


Hcal assembly in progress



11/14/2013

Hi-Bay
Prototype
Assembly Area

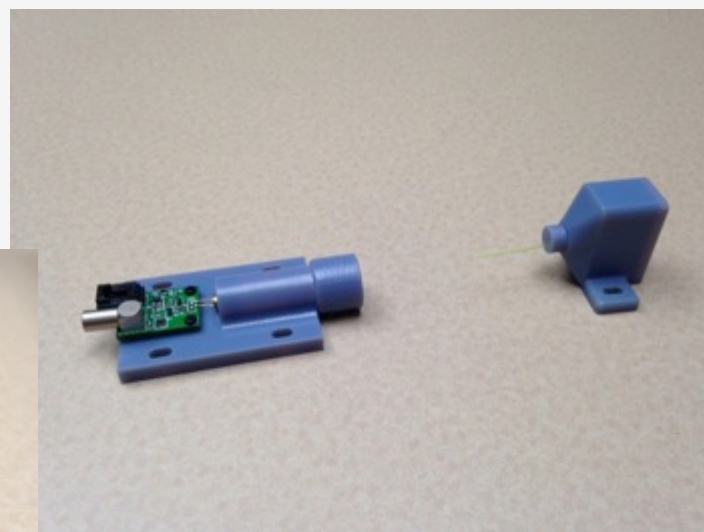
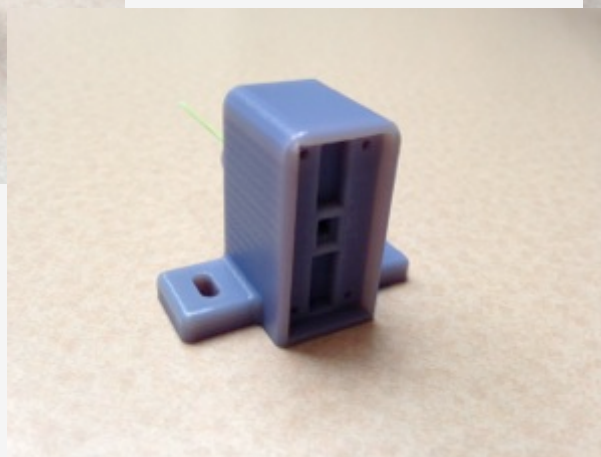
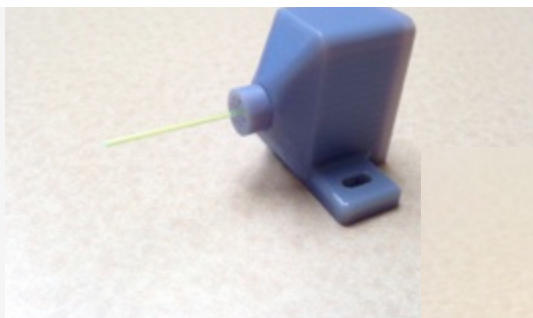
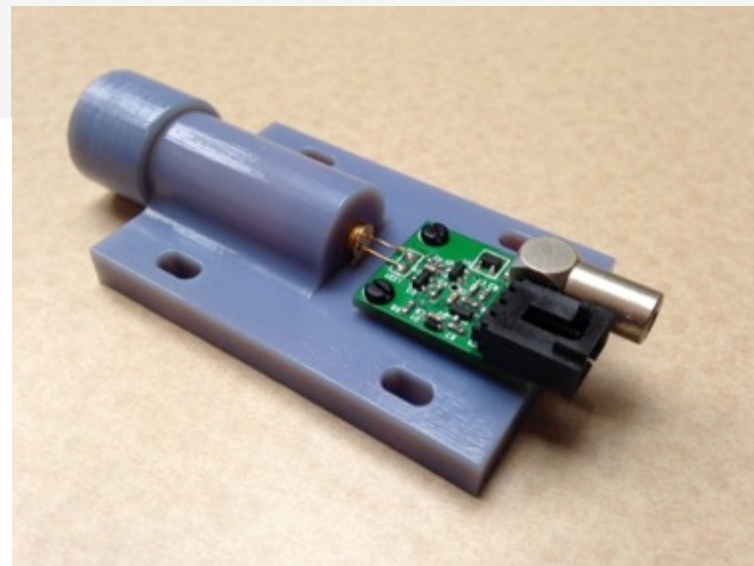
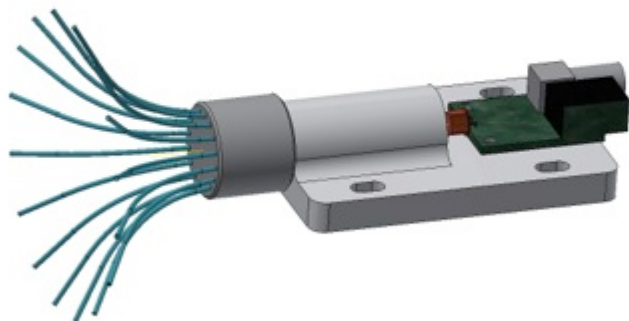


Steve Boose's Tile tester

sPHENIX prototype
electronics rack

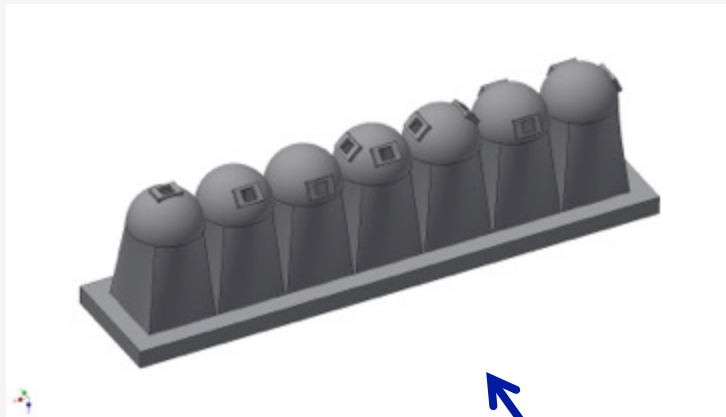
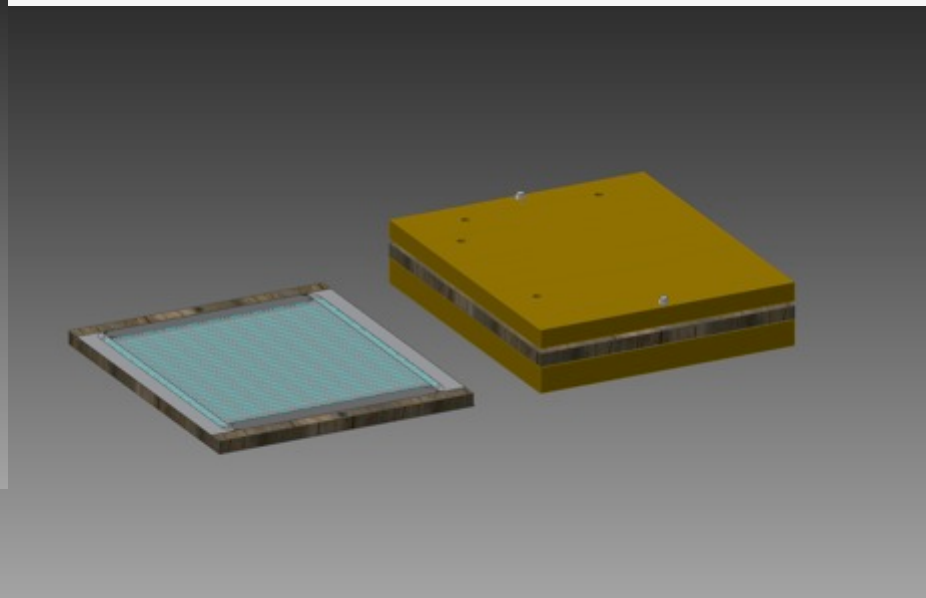
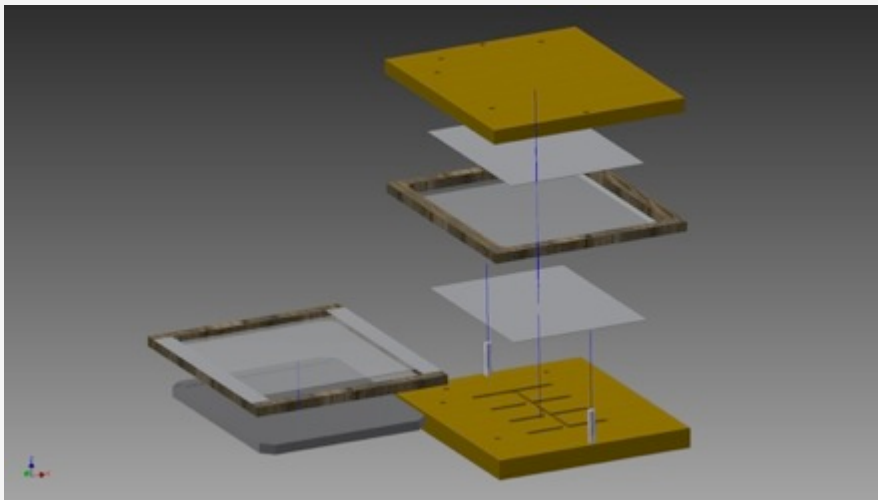


Light Collection for HCal



EMCal Prototype

TECHNICAL SUPPORT NOTES

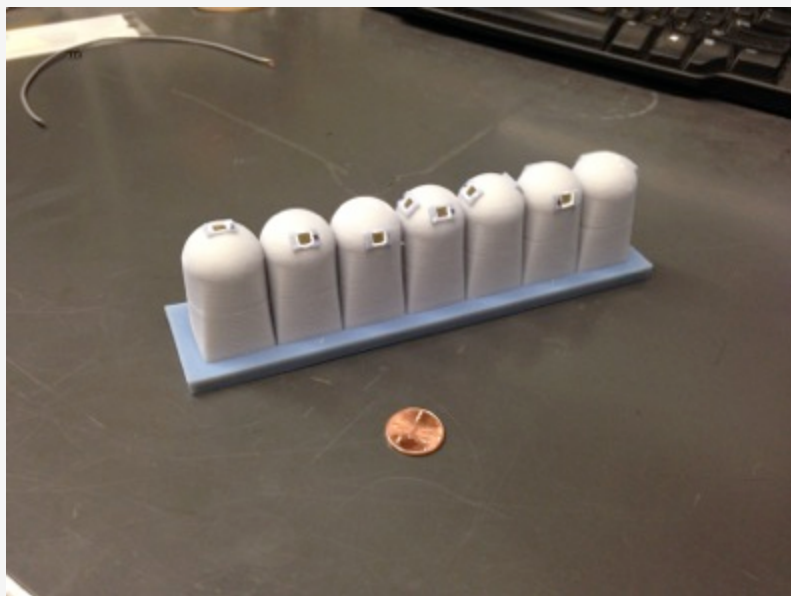


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"Droid Army" light collection



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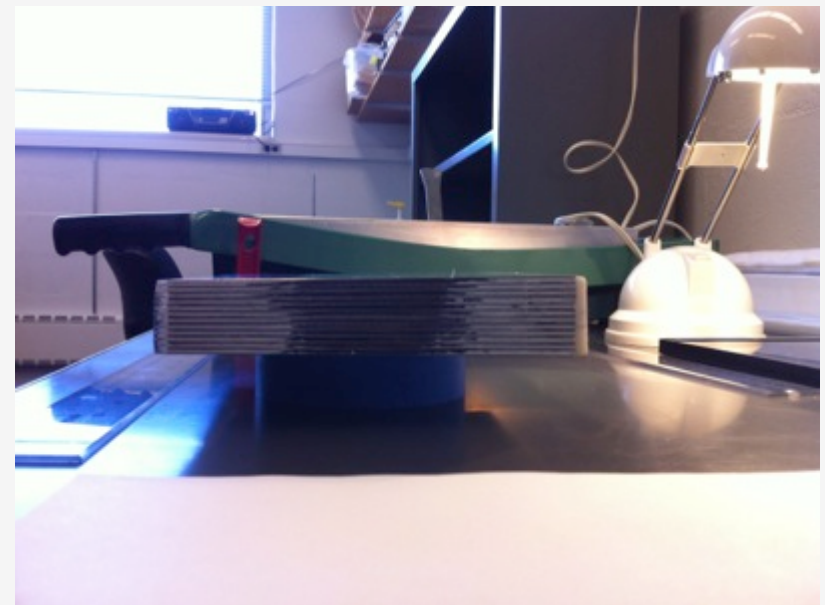
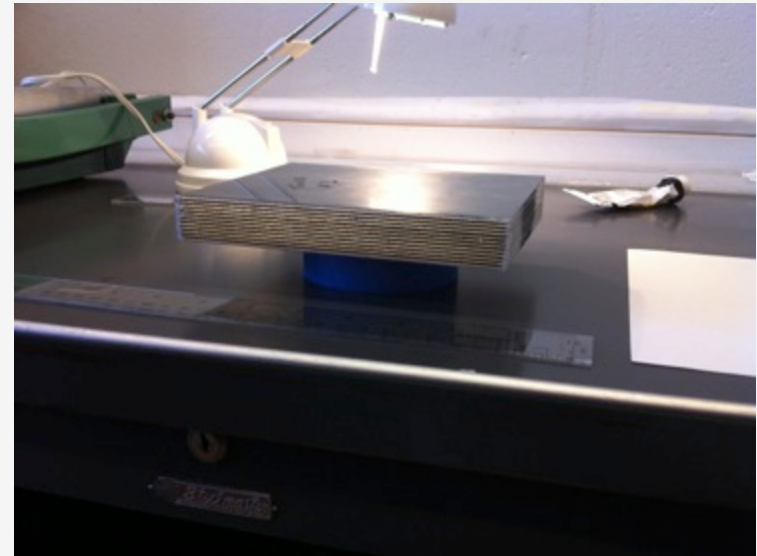
TECHNIQUE - SAMPLE - WORK



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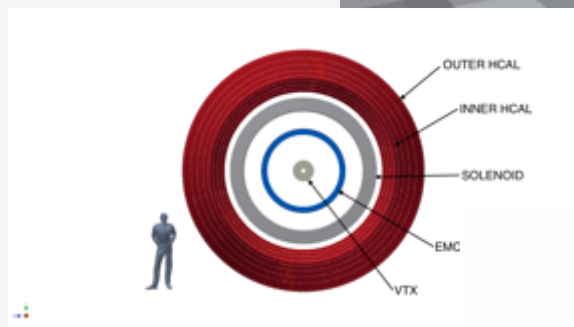
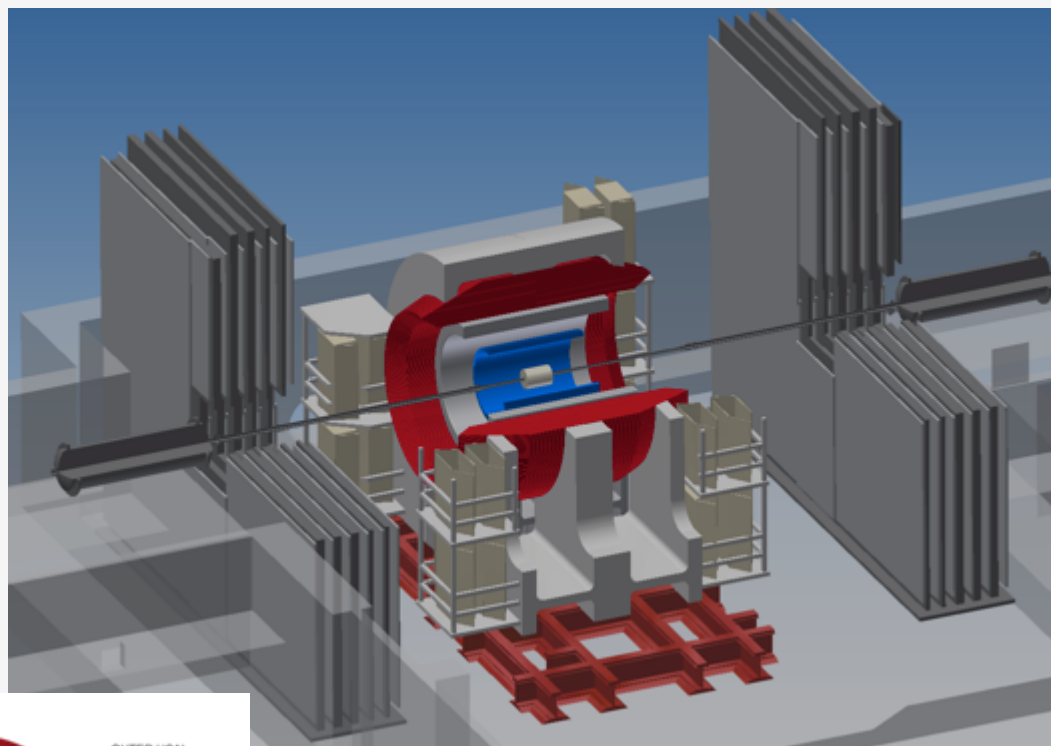
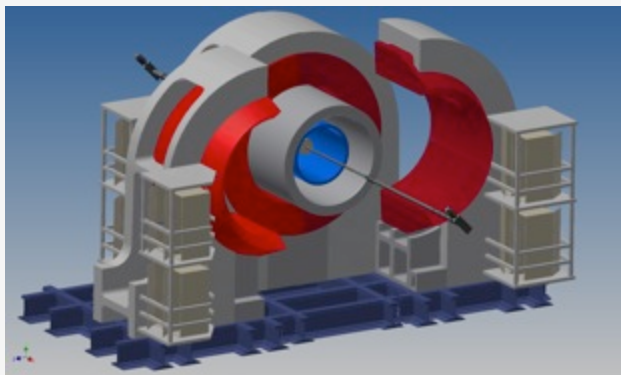


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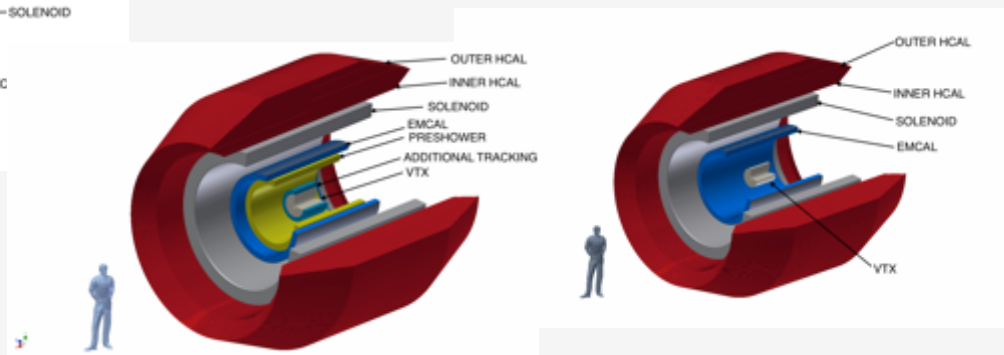


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TECHNICAL SUPPORT

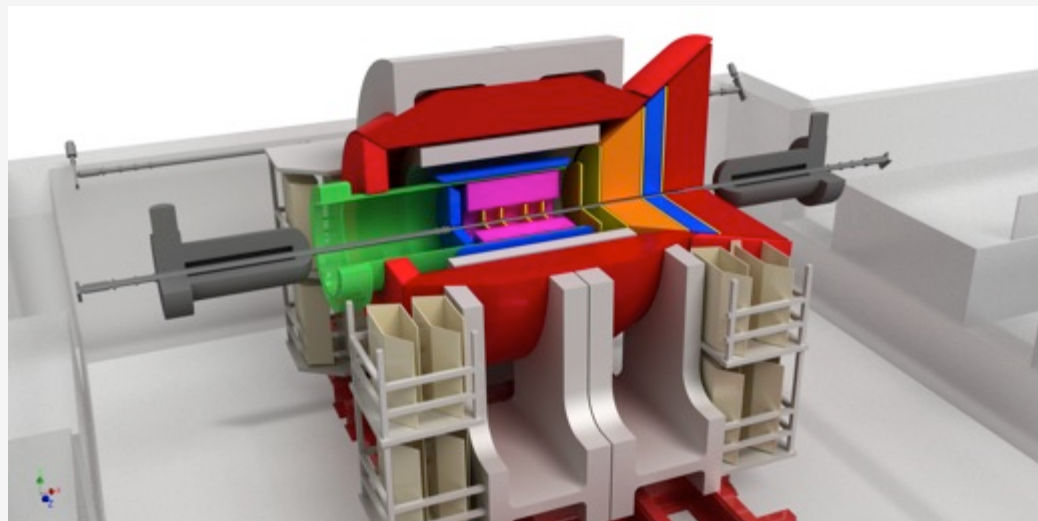


sPHENIX Modeling
support for
updated MIE

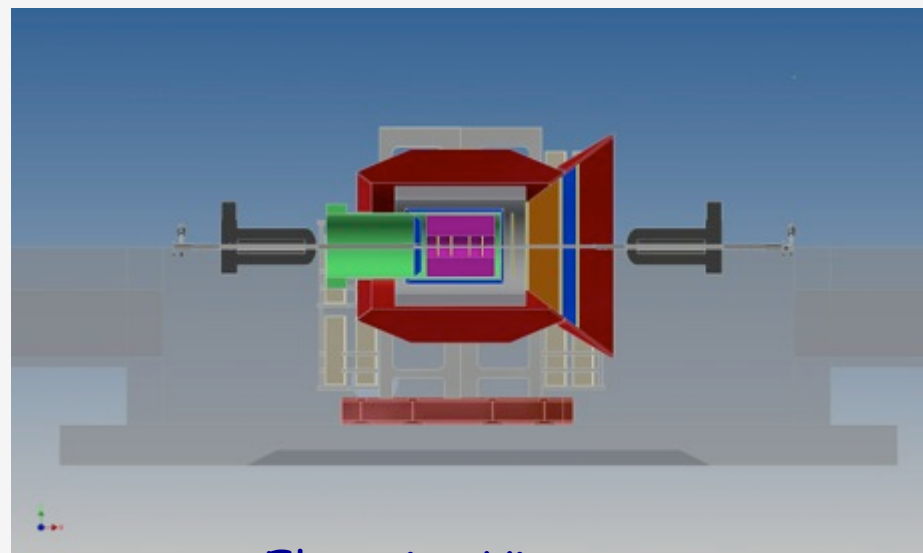
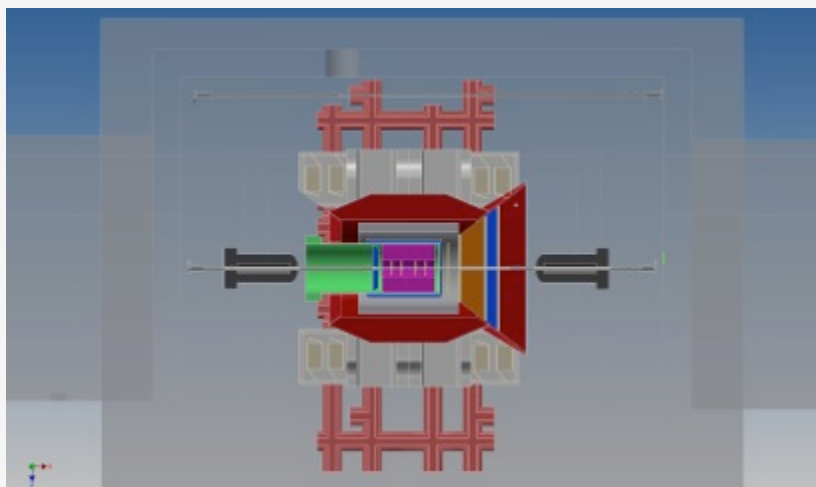


11/14/2013

ePHENIX



Plan View



Elevation View

Window Washer Winch Upgrade Summary of Tasks

Receive and Inspect winch and components - Done

Design and Fabricate Winch & Sheave Base - Done

Install and test Winch, integrate winch w washer hardware, controls and power - Done

Final Inspection and approval of window washer upgrade - Done

(Note: remote safety pin insertion and retraction was installed and has been in operation since the start of run 13.)

John Hynan inspected and made recommendations:

- Correct clamp orientation - Done
- Wear noted on platform cable (existing cable) monitor and replace in near future - will do
- Post maximum load for winch - will do
- Use daily scaffold checklist - will do
- Put winch, cables, and platforms on annual PM schedule - will do

.His recommendations are being implemented. Upgraded window washer platforms now ready for service

Alcohol Chiller Work For Shutdown 2013



Merlin Chiller

➤Chiller supplied about ½ the flow as in the past.

- Pressure on chiller says ~70-80psi
- Install gauge on supply line and measure actual output pressure.
- Replace chiller with spare if needed.
- Send old chiller out for maintenance or replace.

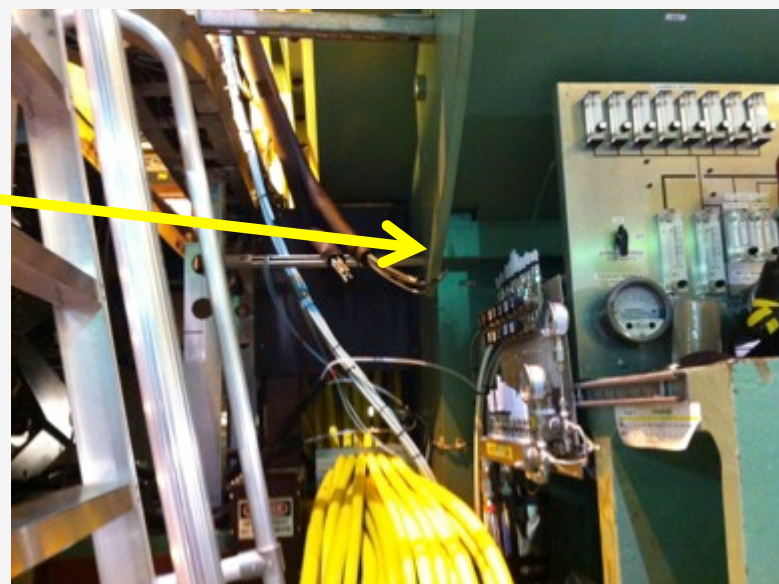
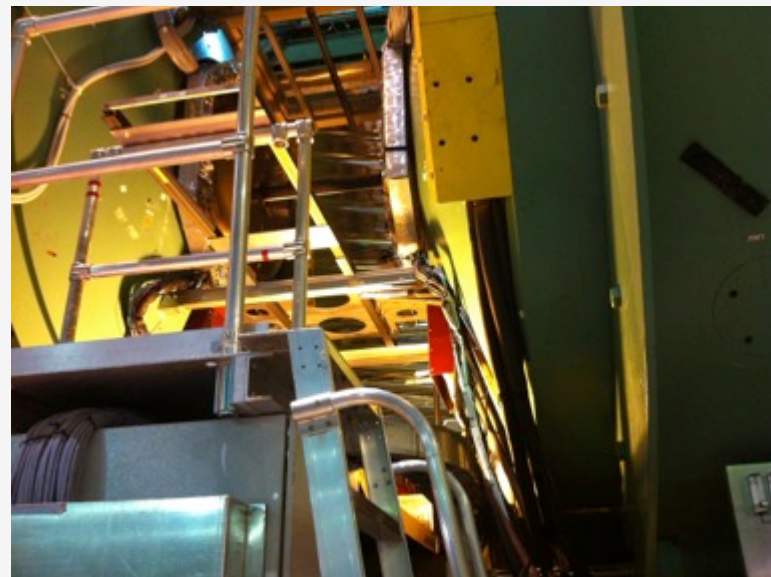
New Chiller failed to be returned for warranty replacement.

Re-Insulate Glycol lines



❖Remove old polyethylene insulation and wrap and replace with foam rubber insulation.

- Temp of fluid is affected too much by temp change in the gas house.
- Lines are condensing and dripping because of gaps in insulation.



Replace VTX supply tubing with stainless steel as much as possible -
in progress

11/14/2013

2013 Shutdown Schedule

TESTING - SCHEDULE - WORK

Prep for 2013 shutdown	Done
Design, Fabricate MPC-Ex	
Define tasks and goals	
Analysis and design of fixtures, tools and procedures	
Fabricate/procure tools and fixtures	
Tests, mockups, prototypes	
Receive, fabricate, modify, finish installables	
Review and approval of parts, tools, fixtures and procedures	
Assembly and QA tests	
VTX Strippixel redesign	Done
VTX Strippixel 1 st article stave assembly	Done
VTX Strippixel 1 st article qualification/performance tests	Done
VTX Strippixel sensor reclamation	Done
Run 12 Ends	Done
Shutdown Standard Tasks	Done
• Open wall, disassemble wall, Remove MuID Collars	
• Move EC to AH, etc.	
VTX/FVTX Post run tests	Done
Disassemble VTX/FVTX services	Done
July 4 th Holiday	Done
Remove VTX/FVTX and transport to Chemistry Lab	Done
Remove Lampshade MMS, East Vertical	Done
VTX strippixel stave production	Done
Pixel Ladder repairs	Done
VTX Strippixel ladder assembly & Test	Done
Assemble, Test and Install MPC-Ex (Partial, location TBD)	7/22-11/22/2013

MuTR Troubleshooting, maintenance and repairs	Done
Summer Sunday (8/4) Prep and teardown	Done
Summer Sunday (RHIC)	Done
DC West troubleshooting & Repairs	Done
DC East Window Upgrade and Related Repairs	Done
Re-assemble VTX/FVTX halves	Done
Test, survey (at Chemistry and IR) and re-install VTX/FVTX	11/1-11/14/2013
Install & Survey VTX/FVTX in 1008 IR	11/14-11/27/2013
VTX Commissioning	11/25/2013-1/31/2014
Other detector maintenance as required	As required
Infrastructure maintenance as required	As required
Pre-run commissioning and prep for run 14	11/25/2013-1/31/2014
sPHENIX HCal Prototype Assembly/test	8/19-12/31/2013
Thanksgiving Holidays	11/28-29/2013
Prep for EC roll in	11/1-12/2/2013
Roll in EC	12/2-12/6/2013
Prep IR for run	12/1-12/15/2013
DC West wire repairs	12/15-12/30/2013
Christmas Holiday	12/24-25/2013
New Year's Day Holiday	1/1/2014
Pink/Blue/White sheets	12/14-1/31/2014
Start run 14	2/3/2014

Safety and Security

From John Maraviglia:

1. ODH-1 Training Practical Wed. 11/13, Wed. 12/4, Fri 12/6

Attend one of these from 11:15-Noon if you need to access tunnel during run 14

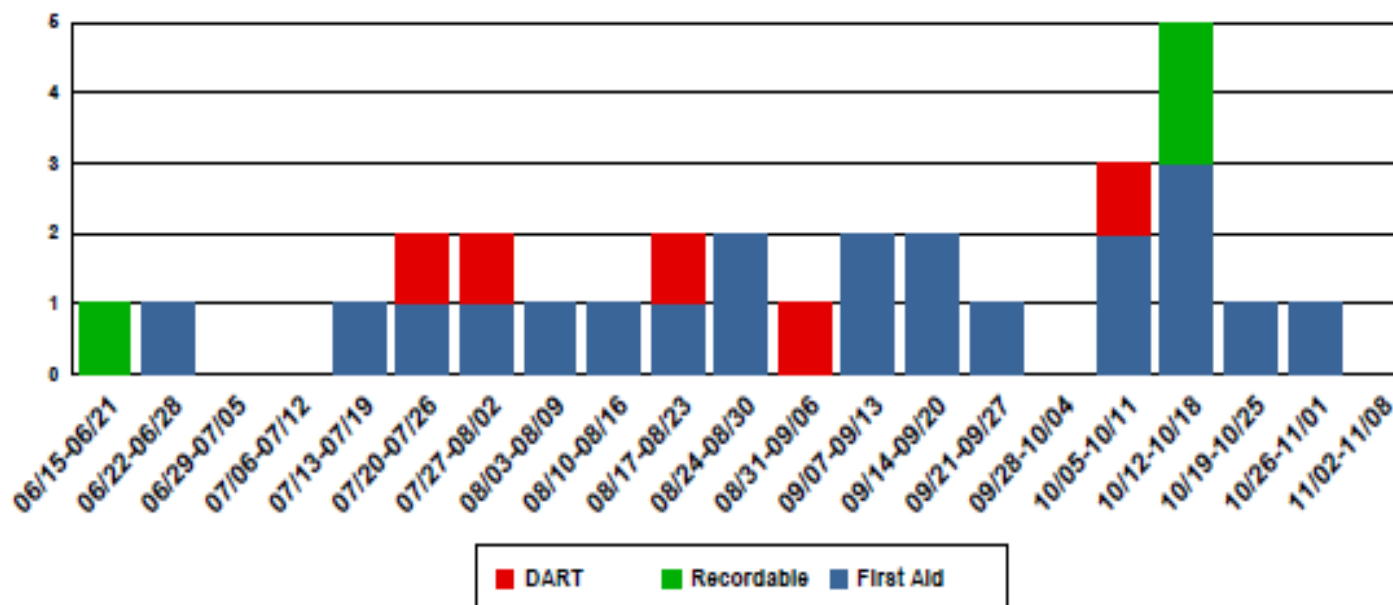
2. Training sessions for the newly installed Vacuum Oxygen Deficiency Hazard (VODH) safety system, See Slides attached

Other Safety Info:

- Vertical Ladder Protocol

TECHNICAL SUPPORT TEAM

Injuries Per Week
As of 11/8/2013



Injury Status:

FY14 YTD: DART – 1, TRC – 3, First Aid – 7

FY13: DART – 14, TRC – 37, First Aid – 53

FY12: DART – 19, TRC – 38, First Aid – 69

FY13 Injury Listing: <https://intranet.bnl.gov/esh/shsd/seg/OccInj/BNLInjuries.aspx>

Recent Injuries

	None
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Recent Events		
11/5/13	SC-BNL	The bellows on the actuator of a shutter within an electron transport line from the NSLS booster to the VUV storage ring developed a vacuum leak, which required the shutter to be closed, thereby securing VUV ring operations. Repair of the shutter at this time would interrupt X-ray ring operation. Management has decided to leave the shutter closed from now through the upcoming planned winter maintenance shutdown for the entire facility. The vacuum leak will result in approximately three weeks of unplanned downtime for the VUV ring operations. The X-ray ring will operate as planned. There is no safety consequence related to the unplanned shutdown of the VUV ring.
11/5/13	SC-4	<p>A motor pool technician accidentally sounded the ambulance air horn while getting the vehicle ready to be moved for routine maintenance. The ambulance was inside the garage. The doors were open. A nearby employee felt pain in his right ear and reported to the Occupational Medicine Clinic (OMC). His ears were examined. There was no injury and he was returned to work.</p> <p>UPDATE, 11/8/13: Noise tests performed on 11/6 and 11/7/2013 confirmed the employee sustained a short duration acute exposure of 143 dB, exceeding the OSHA 1910.95 limit of 140 dB. OSHA 1910.95 is cited in 10CFR851. The technician who accidentally sounded the horn was not exposed to the 140 dB limit. On 11/8/13, after consultation with ESH, this event was determined to be reportable to DOE as a Significance Category 4 event.</p>

Machine Shop Implementation Workshop

- Designation of Machine Shop Supervisors
- Posting of Machine Shop Rules
- Machine Shop Supervisor Training
- Inspection, Procurement and User Training Requirements
- Designation and Communication of Mission Critical Equipment
- Line Organization Fixed Machine Tool Improvement Plans

Modification RHIC Tunnel Vacuum ODH (VODH) System

Ray Karol

January 2013

ODH Controls

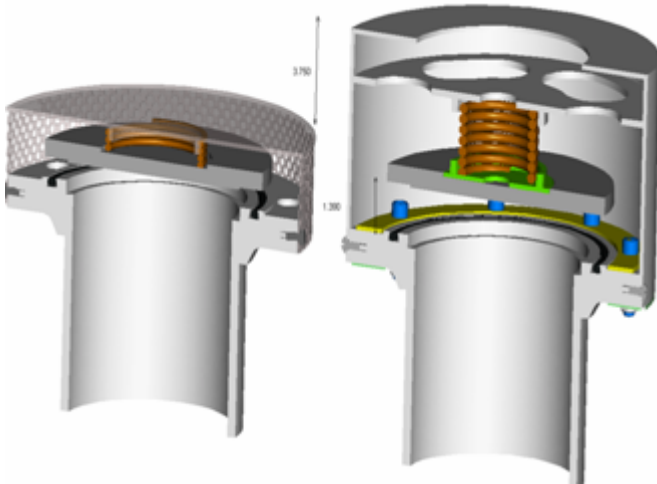
ODH Classification	Required Controls
0	<ul style="list-style-type: none">•Postings•ODH 0 Training (web course), included in C-A Access or Collider User Training Courses
1	<ul style="list-style-type: none">•Postings•ODH 1 Training (web course only)•Practical on PPE (escape pack and POM)•BNL Physical (ODH checked on JAF)•Monthly, documented escape pack inspection•POM has 6-month calibration interval

Brief History of RHIC ODH Controls

- Service/Support Buildings and RHIC tunnel controlled as ODH 0 since RHIC startup in 1999 until FY09 run
- Following LHC major He leak into their tunnel, C-AD considered the possibility of a similar accident at RHIC.
- Conclusion: the potential He release was more than assumed in the original RHIC accident analysis because a RHIC sextant isolation system was not installed.
- Without a failure detection and helium isolation system the RHIC refrigerator could pump a large amount of gHe into the RHIC tunnel if a CERN type failure occurred.
- Locally O2 levels could drop below 14%.
- DOE-BHSC approved this proposal for ODH 1 in 2/09 for Support/Service Buildings and RHIC Tunnel

Restoration of Service/Support Buildings to ODH 0

- In December 2009 DOE-BHSO approved returning the service/support Buildings to ODH 0 after valve box reliefs were routed outside the buildings
- Also had Lexan boxes installed around valve box electrical lead penetrations to route any potential He leaks from these penetrations upwards to building ODH fans



RHIC Cryostat Relief Valve

Leak from magnet line into cryostat and out ~60 relief valves in each sextant to RHIC Tunnel



Typical Cryostat relief
Opens at ~1.2 atm



VODH Pressure Switches



VODH System Purpose

- **Restore RHIC Tunnel to ODH 0 Classification for temperature <40K**
 - Remove need for POM and 5-minute escape pack for tunnel entry
 - However, entrants need to maintain their ODH 1 training and maintain POMs and escape packs as this is the alternative for entry to the tunnel if the VODH system is not operational
- **Goal is to transition RHIC Tunnel to ODH 0 sometime during the FY13 run**
- **RHIC Service/Support Buildings have been ODH 0 since valve box reliefs were routed outside buildings in late 2009**

PASS ODH System

- **PASS ODH – oxygen sensors throughout the RHIC tunnel**
 - Oxygen deficiency defined by OSHA at 19.5% oxygen concentration
 - PASS sensors trip at 18% (accident)
 - Phenix and STAR Intersection Regions are not ODH areas – gas barrier installed
- Since 1999 this system has been operable
- Unfortunately, there can be a long delay between when a release occurs in the tunnel and it is detected.

VODH System

- In addition to the PASS ODH system
- The system consists pressure switches – two redundant strings per ring of magnets – that monitor cryostat vacuum.
- Mechanical diaphragm pressure switches trigger at ½ atm in the magnet cryostat vacuum space and VJ pipes.
- If the system trips **and the tunnel is in an access allowed state:**
 - All tunnel ODH fans start (fans are up to speed before He enters the tunnel)
 - Alarm all tunnel ODH alarms (**leave the tunnel immediately**)
 - Close all affected ring's sextant isolation valves to limit He inventory available to leak into tunnel (If triplet pressure switch trips, both rings isolate).
 - Alarms at MCR and CCR

VODH Safety Improvements

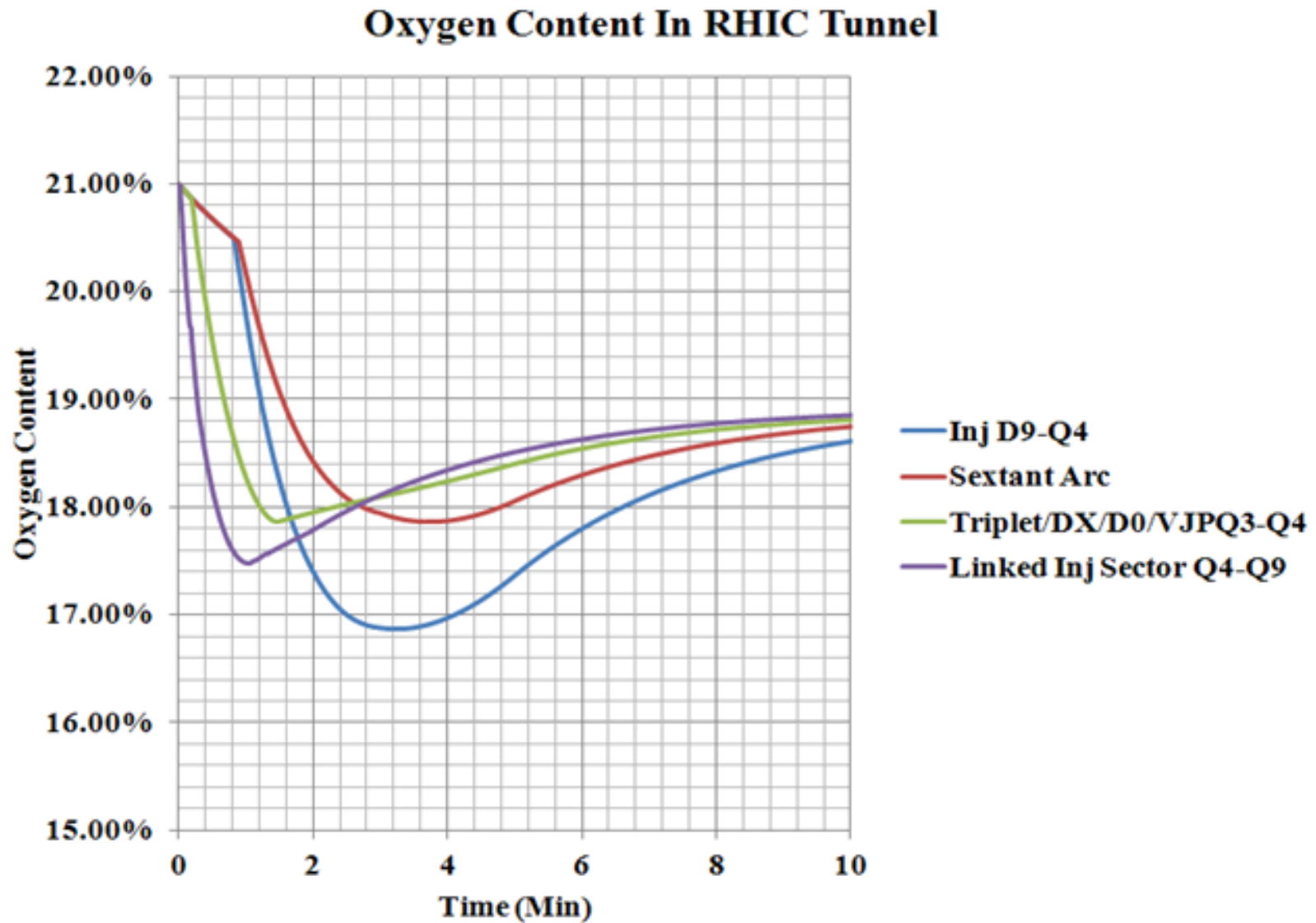
- This past summer, modified small vacuum volumes to a single larger volume in the injection areas to reduce helium flow rate and increase time when He enters tunnel via reliefs into this tunnel section
- VODH system is fail safe – open in a string, switch contacts or wire, causes system trip
- Logic is 1-out-of 2 for a magnet string

Again! Your action as always is to **immediately exit** the tunnel **when you hear the ODH alarms** as taught in CAD Access or Collider User training classes

Computed Oxygen Concentration and Tunnel Temperature

- Calculated with Sinda/Fluint Code
- Minimum oxygen concentration is now ~16% in smallest sextant volume, injection region, within 2 minutes of accident, **worst case**.
- Minimum tunnel temperature is ~8F

RHIC Tunnel Oxygen Transient



ASE Updated

- **ASE approved by BHSO**

3.10. For RHIC tunnel sextants when the superconducting magnet cryogenic system is cooled below a temperature of 80 K:

3.10.1. At least three ODH exhaust fans in each RHIC tunnel sextant must be operational, and

3.10.2. The ODH portion of the RHIC ACS must be operable, that is, when the oxygen concentration falls below 18% (nominal), the ODH fans in that sextant must turn on.

Authorized Alternative: If less than three ODH fans are operable in a sextant or the ODH portion of the RHIC ACS is out of service, entry to that sextant is allowed if each entrant has their own 5-minute escape pack (or a self-contained breathing apparatus) and a portable oxygen monitor.

3.11. For RHIC tunnel sextants when the superconducting magnet cryogenic system is cooled below a temperature of 40 K, and tunnel entry is allowed by the ACS:

3.11.1. At least three ODH exhaust fans in each RHIC tunnel sextant must be operational, and

3.11.2. The ODH portion of the RHIC ACS must be operable; that is, when the oxygen concentration falls below 18% (nominal), the ODH fans in that sextant must turn on, and

3.11.3 **The VODH system must be operable; that is, at least one of the two vacuum space pressure switch strings for each magnet string is operable.**

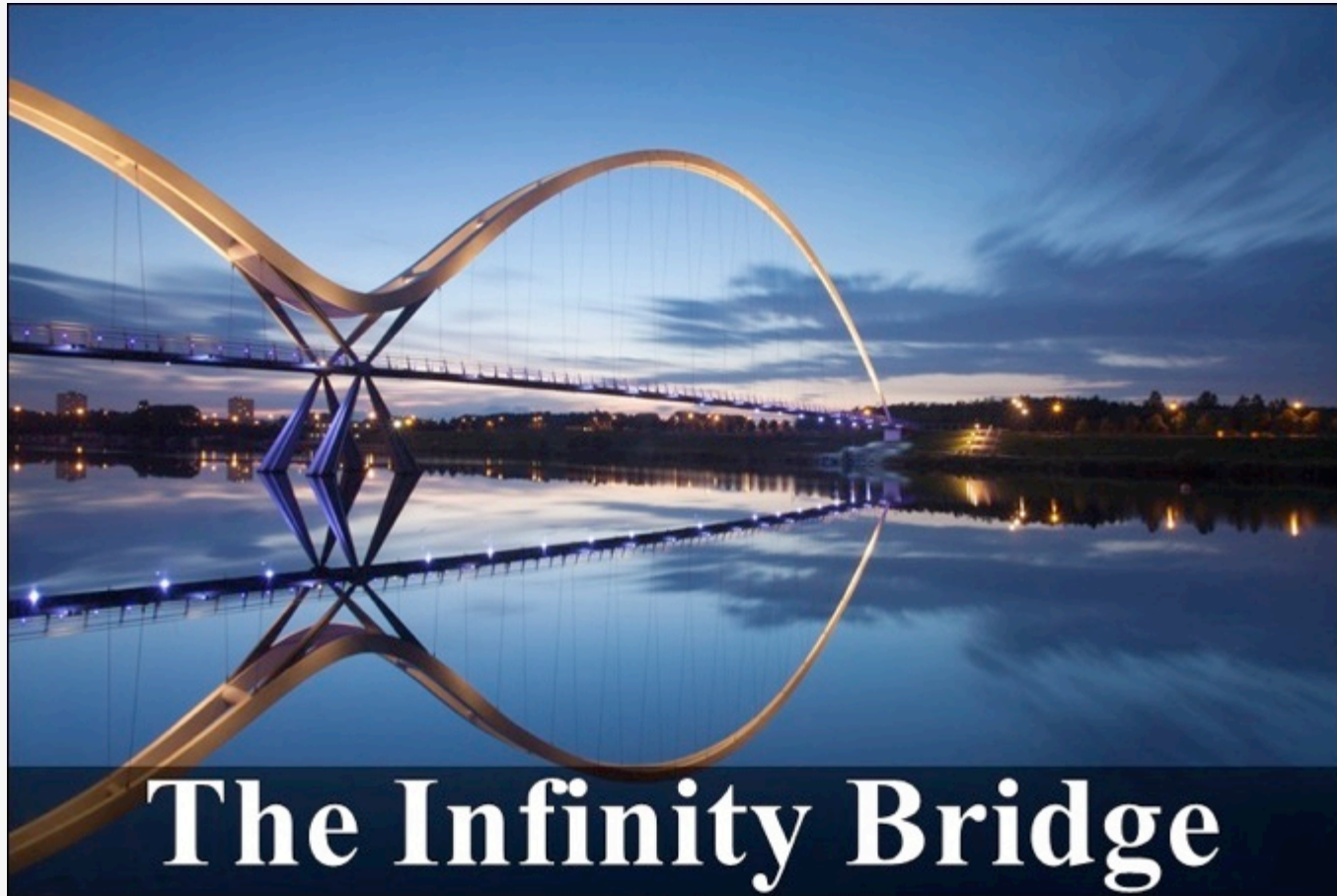
3.11.4 When any of the installed pressure switches that monitor the magnet cryostats and vacuum jacketed piping sense a pressure of ½ atm (nominal) in these vacuum spaces, the ODH fans and the ODH alarms in the entire ring must turn on, and the cryogenic system isolation valves in the affected ring must close.

Authorized Alternatives:

If less than three ODH fans are operable in a sextant or the ODH portion of the RHIC ACS is out of service, entry to that sextant is allowed if each entrant has their own self-contained breathing apparatus and a portable oxygen monitor.

If both strings of the VODH system are out of service, entry into the tunnel is allowed with work planning and each entrant has their own 5-minute escape pack (or a self-contained breathing apparatus) and a portable oxygen monitor.

Where To Find PHENIX Engineering Info



http://www.phenix.bnl.gov/WWW/INTEGRATION/ME&Integration/DRL_SSint-page.htm

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